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ABSTRACT

This paper explores, from two perspectives, the potential contribution of U.S. occupational information systems and other related programs to human resources development (HRD) in other countries, particularly in developing countries. The first perspective arises from initial and subsequent research on occupational information systems design and use in the United States. The second arises from work within the international development community and the United Nations Development Program in particular. The paper: (1) outlines the context for HRD in developing countries, documenting policy and planning problems; (2) discusses the need to improve diagnostic and analytical capabilities, the critical role played by information in reducing the levels of uncertainty encountered in HRD policy formulation, and the importance of seeking proactive rather than merely reactive solutions; (3) defines occupational information in the context of HRD, specifically within the broader framework of economic and labor market information as a key element in HRD strategies, and reviews recent efforts to organize HRD information flow in the world; (4) assesses the relevance, scope, structure, and technical relevance of the National Occupational Information Coordinating Committee/State Occupational Information Coordinating Committee (NOICC/SOICC) network to development assistance efforts in HRD; and (5) presents conclusions and recommendations for further consideration by NOICC, the development community, and countries where the NOICC/SOICC model may be relevant. (67 references) (KC)

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NOICC Occasional Papers/1

Occupational Information and International Development

Improving HRD Diagnostics

J. E. S. Lawrence
United Nations Development Program

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
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The NOICC/SOICC Network

The National Occupational Information Coordinating Committee (NOICC) promotes the development and use of occupational and labor market information. It is a federal interagency committee, established by Congress in 1976. Its members represent nine agencies within the U.S. Departments of Labor, Education, Commerce, Agriculture, and Defense.

NOICC has two basic missions. One is to improve communication and coordination among developers and users of occupational and career information. The other is to help states meet the occupational information needs of two major constituencies: 1) planners and managers of vocational education and job training programs and 2) individuals making career decisions.

NOICC works with a network of State Occupational Information Coordinating Committees (SOICCs), also established by Congress in 1976. SOICC members represent state vocational education boards, vocational rehabilitation agencies, employment security agencies, job training coordinating councils, and economic development agencies. Many also include representatives from higher education and other state agencies.

The NOICC/SOICC Network supports a variety of occupational information programs and systems. Some provide data to help in planning vocational education and job training programs. Others offer information for individuals who are exploring occupational options and making career decisions.

Organizations and individuals undertaking special projects funded by the National Occupational Information Coordinating Committee are encouraged to express their professional judgments. The analysis, interpretation, and opinions expressed in this document, therefore, do not necessarily represent the official position or policy of NOICC members or their representatives, or the NOICC staff, and no official endorsement should be inferred. Neither do the views in this paper necessarily reflect those of the United Nations Development Program, its governing council, or member governments of UNDP.

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Acknowledgements

This report was prepared for the National Occupational Information Coordinating Committee by John E. S. Lawrence of the United Nations Development Program (UNDP). UNDP is the world's largest multilateral grant development assistance organization. It maintains a network of offices in 112 countries and draws on the expertise of some 36 specialized and technical UN agencies to work in virtually every sector of development. UNDP also works extensively with nongovernmental organizations. In 1989, UNDP served 152 developing countries and territories through 6,900 projects valued at approximately US$7 billion.

The goal in all UNDP's activities is the permanent enhancement of self-reliance and human development. UNDP projects are therefore designed to:

- identify and quantify productive resources;
- provide technical training at all levels and in all requisite skills;
- supply equipment and technology in conjunction with training;
- assist in planning and coordinating development efforts.

UNDP also plays the chief coordinating role for development activities undertaken by the whole United Nations system. The Program is financed by voluntary contributions from nearly every nation in the world. In 1989, governments pledged more than US$1.2 billion.

This report was developed in cooperation with James Woods, Occupational Information Systems Coordinator, and other NOICC staff. It was edited by Roberta Kaplan and produced by the Northwest Regional Educational Laboratory in Portland, Oregon, for the NOICC Training Support Center.

Foreword

Over the years, the NOICC/SOICC Network has attracted the attention of many countries that, like the United States, are facing serious problems in human resources development. They, too, need reliable data on which to base decisions about education, employment and training, and economic development programs. In developing countries, the problems are severe, as governments face excessive population and labor force growth, strained education and training systems, scarcity and inequality in occupational opportunity, and spreading technological change. Many industrialized countries, concerned about similar problems, also are searching for strategies to address them. What does our Network have to offer that might help other countries deal with these issues — and what can we learn from them in return?

In this paper, John Lawrence explores the relevance of the NOICC/SOICC experiment to human resources development. He examines the issue from two perspectives. The first stems from his participation in the initial and subsequent research on occupational information systems design and use in the U.S. The second arises from his work within the international development community and the United Nations Development Program, in particular. Dr. Lawrence suggests a number of areas in which the NOICC/SOICC forum and experience might be of assistance in human resources development. Although his analysis, especially in chapters 1 and 2, focuses on less industrialized countries, the description of the NOICC/SOICC Network and his recommendations, in chapters 3 and 4, may be of interest to countries at many different points along the economic spectrum. He also points out opportunities for the U.S. to learn from others in the global community.

Because of its mission, NOICC is at the center of America's network of producers and users of occupational information. For more than a decade, we have provided a forum for data producers and users to exchange information and explore ideas of mutual concern. Our role as a coordinator gives us a unique opportunity to identify key issues and developments and to call attention to them through our programs and publications.

This series of occasional papers provides the NOICC/SOICC Network with another means of sharing information about important innovations and issues concerning the production or use of occupational, career, and labor market data. The series is part of a larger effort to support activities of the Network through the services of the NOICC Training Support Center. We hope you will find the series informative and useful.

Juliette N. Lester
Executive Director

Occupational Information and International Development

Improving HRD Diagnostics

John E. S. Lawrence

1. Introduction and Background

Introduction

This paper explores, from two perspectives, the potential contribution of U.S. occupational information systems and other related programs to human resources development (HRD) in other countries, particularly in developing countries. Since the unique network of National and State Occupational Information Coordinating Committees (NOICC/SOICC) was set up in the United States in 1976, substantial research and development into system design and utilization has emerged, as well as almost a decade and a half of programmatic and operational experience. The first perspective therefore stems from the author's participation not only in the original study recommending Congressional legislation initiating the NOICC and SOICCs (Drewes and Katz 1974), but also in subsequent research on occupational information systems design and use in the U.S. (e.g. NOICC 1981; Lawrence and Cruze 1981; Drewes et al. 1985).

The second perspective is that of the international development community, in which agencies such as those within the UN system, and more particularly the United Nations Development Program, are closely involved in technical assistance for HRD in all world regions and are seeking innovative HRD methodologies as potential models for the consideration of country governments. From this point of view, HRD problems are becoming exacerbated worldwide, among them unequal access to or inadequate quality of education and training, paradoxically heightened expectations of educational "consumers" in the face of sharp fiscal austerity, tighter job markets, and changing skills requirements. Many of these problems are shared across national boundaries. In some cases, quite similar statements have been made about the need for improved quality, adaptability, and responsiveness — and consequently better labor market and

occupational information for education and training planning — by state governors in the U.S. on the one hand and heads of state or senior government officials in the developing world on the other. Renewed calls have been made at the national level in the U.S. for clearer definition of the multiple roles of different levels of service providers in education (Joint Economic Committee 1989) as well as for more coordinated HRD strategies (Lawrence 1987). Comparable appeals for integration between sectors in HRD are being made in the developing world, as reflected, for example, in developing country studies (Bazargan 1988; Lawrence and Stevens 1988) and UN documentation (ILO 1987; ESCAP 1988).

For more comprehensive human resource development strategies to be effective, they need information. It is their lifeblood, flowing through the entire system of service delivery. Just as the pulmonary oxygen exchange occurring continuously in the human body is necessary to survival, information must be exchanged continually with the environment, reconstituted, and updated through routine scanning and adjustment. Such a systematic approach to information-processing ideally necessitates several types of commitment. It implies some sort of legislative base, defining key parameters in the assignment of resources to the necessary data series and interpretative and dissemination services, broad prescription of purpose, and perhaps specification of important standard definitions. Also implied is some degree of consensus regarding the value of joint involvement among identified "stakeholders" in the HRD policy arena who may contribute to, as well as use, the information provided. And finally, there must be adequate technical and managerial capabilities to ensure high quality in the various aggregatory, comparative, analytical, and diagnostic functions supported by the data flow. For the information to be optimally useful for policy, as well as for counseling or individual decisions regarding occupational preparation or choice, data must be credible at the source, timely, and interpreted with sophistication adequate to the particular application.

The NOICC/SOICC Network in the United States has addressed many of these issues. It has a legislative framework at national and state levels. The "coordinating committee" structure facilitates the working consensus of a number of important HRD stakeholders and permits an unusual interagency perspective in performance of its objectives. The focus of the information provided is neither exclusively toward agency policy and practice nor toward individual occupational decision making, but a pragmatic mix of both of these dimensions. Technical quality of the information disseminated through the system is maintained by a core of full-time professional staff, supplemented by association with the statistical offices of government, as well as access to the wider U.S. research and development community in universities and public and private institutions. As such, NOICC/SOICCs have served not only as a model but also as a source of direct technical assistance for other nations.

While much of the analysis in this paper focuses on developing countries, the NOICC/SOICC model may prove useful to countries at different points along the economic spectrum. Many countries have become interested in the NOICC/SOICC

approach and have sent representatives to meet with NOICC staff. Among them, for example, are Canada, Great Britain, France, Hungary, Indonesia, Japan, Mauritius, the Netherlands, Pakistan, Poland, Korea, Turkey, and the Soviet Union. Chapters 3 and 4 of this paper highlight the potential relevance of the NOICC/SOICC model for consideration by any country.

Purpose and Organization of the Paper

In view of the resource constraints restricting most countries' progress in this area of information flow and use, it is necessary to reexamine the concept of the information component in HRD policy, and potential contributions of NOICC/SOICC to efforts in the developing world in this regard.

The present paper therefore:

- outlines the context for human resource development in developing countries, documenting the nature of the problems facing those responsible for HRD policy and planning;
- discusses the need to improve diagnostic and analytical capabilities, the consequently critical role played by information in reducing the levels of uncertainty encountered in HRD policy formulation, and the importance of seeking proactive rather than merely reactive solutions;
- defines occupational information in the context of HRD, and specifically within the broader framework of economic and labor market information as a key element in HRD strategies, and reviews recent efforts to organize HRD information flow in the world's regions;
- assesses the relevance, scope, structure, and technical relevance of the NOICC/SOICC Network to development assistance efforts in HRD; and
- presents conclusions and recommendations for further consideration by NOICC, the development community, and countries where the NOICC/SOICC model may be relevant.

Background

As the world moves toward the close of the century, there is a growing recognition of crucial interdependencies among countries as they face extraordinary socioeconomic forces for change. All nations share a desire for accelerated social and economic development. In particular, all nations share in various ways a commitment to the improved development of their human resources, despite serious inhibiting factors that slow down equitable progress toward better quality of life for all. The development community, including the UN system, and more specifically the United Nations Development Program (UNDP), views HRD as both a means and an end in international

development, i.e. "not only an instrument of self-sustained growth, but also as an objective of development itself" (UNDP Governing Council Decision 88/29). A more detailed discussion of the elements of HRD (and other key definitions) is provided in the next chapter, but the term is used here in the broad sense of longer term, strategic approaches to the preparation and sustenance of individuals for economically productive and/or socially contributory roles in societies.

While most countries, rich or poor, acknowledge common difficulties in the area of human resources (e.g. rural/urban migration, youth unemployment), their ability to cope varies widely. Profound inequities and disparities exist between and within nations in terms of their capacities to provide solutions to human resources problems, and some have even questioned the "myth" of common problems between industrialized and developing nations (King 1984). Yet in one way or another, we are all affected by the disequilibria resulting, for example, from growing numbers of illiterates worldwide, currently approaching one billion persons (Lind and Johnston 1988), or heightened international unemployment, estimated by the International Labour Office (ILO) to be more than 30 percent in urban areas in some African countries (ILO 1988). The challenge is to find low cost, more integrated HRD strategies that reduce inequities and provide enhanced opportunities for individuals in all nations to realize their productive or contributory capacities.

The problems confronting those responsible for human resources development in the future are thus considerable in all countries, but, in many of the poorest nations, they are truly awesome. For the purposes of this paper some illustrative examples will suffice to document the breadth and scope of these HRD issues.

On the supply side, the demographics of steady population growth represent larger and larger numbers of young people coming "on line", for example for formal education systems or labor market participation. UNESCO has estimated the following proportional representation by regions of the world population in 1990 in the age group 5-14 years (UNESCO 1989):

Region	*Percent of population aged 5-14 yrs*
World overall	20
Developed countries	15
Africa	27
Latin America/Caribbean	23
Asia	21
Arab States	26

(Note: Developed countries are defined in this case by UNESCO to include all European countries except Yugoslavia, and Australia, New Zealand, Canada, Israel, Japan, South Africa, USSR, and the USA. The rest are defined as developing countries.)

Only marginal increases are projected for developed country populations over the next decade. In the U.S., the demographics are changing in that the work force is getting significantly older, with some shortages in the near term. The same is not true for the developing world, with annual average population growth rates in the 3 to 4 percent bracket. This growth, instead of providing a rationale for steady extension of needed services, constitutes a stark threat to existing institutions. Already overloaded, public sector agencies struggle to respond. Private sector options remain beyond the economic reach of the majority. Quality of services suffers, and inefficiencies exemplified by retention and dropout rates in schools are unacceptably high. Educational attainment, measured by traditional indices such as years of schooling, in the poorest African countries is approximately one quarter of that found in the United States. Studies of learning achievement in primary schools as measured by standardized tests suggest that children from poorer countries score about one standard deviation lower than those from industrialized countries (Heyneman and Loxley 1983).

Most disturbing of all is the estimated proportion of the population with no education at all. These proportions vary widely worldwide. In Niger, for example, UNESCO estimates that in 1977, 95 percent of females aged 10 years or older had received no schooling, whereas in El Salvador in 1980, for example, this proportion was 33 percent (UNESCO 1988). Proportions of total population with no education by major world region have been estimated as follows (Horn and Arriagada 1986):

Region	*Percent of population with no education*
East Africa	38
West Africa	70
Middle East/North Africa	66
South Asia	58
East Asia and Pacific	17
Latin America/Caribbean	22

Reasons for non-attendance at school are complex and include location in remote areas, malnutrition and disease, and early occupational and family commitments. The implications for skills levels of national human resources are not encouraging. The net positive effects of remedial (e.g. adult literacy) programs on existing pools of illiterates are gravely jeopardized if the flow of new entrants into the pool is augmented each year. In addition, inequities become exacerbated in educational systems favoring the affluent, males, and urban communities.

On the demand side, ballooning labor force growth strains the capacity of the employment sectors, both formal and informal. The World Bank estimates the periodic average annual growth of the labor force in Sub-Saharan African regions to be as indicated in the table on page 6 (World Bank 1988).

Region	*Average annual growth of labor force*		
	1965–73	1973–84	1980–2000
Francophone countries	2.0	2.1	2.8
Anglophone countries	2.1	2.4	3.1
Other	2.3	2.2	2.5

As contrasted with industrialized countries, where the majority of employment is in the formal (structured or wage/salary) sector, the developing country employment framework is rather different. In Africa, for example, the informal sector, as variously defined, may account for 21 percent or more of total labor force activity. In urban areas, this proportion approaches two-thirds of the urban labor force (ILO 1988).

Formal sector employers complain about the lack of skills among those exiting educational programs at all levels. A recent study of modern sector enterprises in Burundi found quite extensive differences between actual skill levels of employees and those reported by employers as preferred (Lawrence and Balet 1989). Unemployment and underemployment of successful completers is relatively commonplace. Research in Kenya has shown that due to expansion of the educational system, "today's primary school completer is fortunate to get even a menial blue-collar job in the wage sector, and [the] chance of obtaining a white-collar job is virtually nil" (World Bank 1988 p. 23). Data from the late seventies in India, Malaysia, and Indonesia demonstrate unemployment rates for secondary and tertiary completers more than three times that of primary school completers (Tilak 1987).

Technology impacts on the workplace, from farm to factory and from offices to hospitals, changing the way people perceive, prepare for, and conduct their work, both in industrialized countries such as the U.S. (Joint Economic Committee p. 123-4) and in the developing world (ESCAP 1988 p. 23). Such impacts are not well understood, but are presumed to have widespread implications for the development of human resources.

Thus education is buffeted by currents of change both upstream (demographic) and downstream (employment requirements), even as it competes in national budget negotiations for increasingly scarce public funds. Moreover, education, while perhaps the most central, is nevertheless only one component in a multidimensional array of service-providing agents which make up the HRD service-delivery network. That network will include pre-service and supplementary in-service training, as well as health, social security, and employment infrastructures such as maternal/child nutrition programs and employment exchanges. What is needed are innovative approaches, ideally well-grounded in socio-psychological and economic theory, that can "winch" together educational programs with these upstream and downstream factors without

revisiting the predominantly reactive and ineffectual tracking associated with traditional manpower planning.

As a consequence, HRD strategies must become more comprehensive and integrated, bringing together diverse actors and agencies from both public and private sectors. The policy environment for HRD decision making is thus more complex, and the costs associated with inappropriate decisions are higher when aggregated across multiple stakeholders (parents, students, employers, workers, taxpayers, and government and non-governmental agencies involved in HRD programs). Furthermore, there is a serious gap in existing theories of the nexus of HRD — the relationship between education and work. It is crucial that HRD strategies go beyond simply human capital or screening theories on the supply side and labor segmentation theories on the demand side. What is needed is a more intelligent "fit" between the preparation and the management/utilization of human resources.

One of the most reliable empirical findings in this area has demonstrated that when individuals are surveyed as to reasons for seeking better education for themselves or their children, they most often respond in terms of expectations for better job opportunities (Harvard University 1980). Yet discussions calling for closer concordance between education and the world of work usually are perceived as having primarily vocational education connotations; they are therefore deflected mistakenly away from the academic mainstream instead of exerting a gravitational pull on the whole system. Simply "tuning" education and training systems to some (usually inaccurate) estimates of numbers and skills requirements of arbitrarily specified occupations will not suffice. Nor will coordinative mechanisms that seek only to bring education and training closer together or to impose artificial forms of centralized or highly targeted planning (McGinn et al. 1985).

Better understanding of the empirical linkages, however, between education and the workplace and a more curious, diagnostic search for explanatory power in a coordinated HRD theory seem essential:

> The next few years are ripe for a synthetic theory capable of explaining the links between educational level, the quality of skills (academic, vocational, general, specific), labor market entry, promotion and mobility, the impact of different types of learning and experience on income levels, productivity ... lifetime earnings, lifetime productivity, income distribution and status distribution (Little 1986 p. 13).

In a climate of such uncertainty, not only policy makers and planners, but also individuals need at least targeted and timely descriptive information. Improved theory would aid in deciding what data should be collected and interpreted for HRD planning purposes. A key weakness in most countries, particularly the poorer and less developed nations, is the lack of a strong diagnostic or analytical capacity in interpreting the various signals being transmitted from the socioeconomic environment. Even where such interpretative capabilities exist, they are often disaggregated (e.g. in employment services, private sector corporations, or banks). Consequently, much of the information

may be proprietary, difficult to access, for example for research purposes, and limited to specific intra-agency objectives such as establishment tax computation.

Part of the problem is a reluctance to be too mechanistic or quantitative about human resource development, in which individual choice must still be a paramount objective in democratic societies. In the design and implementation of a nation's water resources strategy, for example, it makes sense to have adequate statistics on supply (i.e. rainfall), source locations, distributions, quality, rates of flow, and various types of consumer demand (e.g. irrigation, drinking water, sanitation, or recreation). Relevant "upstream" and "downstream" data would be reasonable to request for any point decision such as the situation of a new pulp mill on a major river. Although such strategies might yet be embryonic in many countries at the present time, few would contest the need for regular monitoring of such information.

When it comes to human resources, however, apart from the fact that the processes and therefore the data are far more complex, the rationality of comparable information systems to inform policy seems far less widely recognized among the traditional HRD constituencies. Previous, and generally ineffective, manpower planning efforts have partially contributed to this shortcoming. Where public data systems exist, they tend to be fractionated, serving primarily and rather naturally little more than the narrow purposes of the agencies responsible for their funding. Even in some of the most advanced countries, HRD information systems are more sophisticated in "demand" than "supply" side information, and they are weakest of all in the linkages between demand and supply. They have shortcomings in their basic descriptive as well as their predictive capacities and are usually underfunded and underutilized. In the poorer and less developed countries, the lack of this coordinated diagnostic, analytical capability among the major HRD agencies is more acute and leads to two undesirable consequences.

The first is that policy makers and individuals are shortchanged by lack of critical information except at certain points in time, such as planning cycles for Five Year Plans. The capacity for more routinized "scanning" of the HRD policy environment is not developed. The necessary research base is usually rudimentary, and statistical series such as censuses or other surveys, apart from their technical limitations, are not adequately coordinated with each other or accessible enough for operational decision making.

The second consequence is that national governments become unduly dependent on outsiders for their analytical or diagnostic information supply into the policy making process. Sector assessments or special studies usually precede major policy moves and are conducted most often by consultants and/or by the lending or granting agencies involved in development assistance. Thus an inadvisable double dependency is engendered, both for the necessary data manipulation as well as for the eventual fiscal resource base for required program implementation (Sack 1989). Yet the precipitous withdrawal of either of these assistance modalities is clearly unacceptable to either country governments or the international development community.

One way out of this dilemma is to increase developing countries' indigenous capacity for gathering, and especially interpreting, data for policy purposes. It is this ability to diagnose and monitor problems objectively and to seek proactive rather than merely reactive solutions that is the primary focus of this paper.

In the HRD field, the importance of comprehensive information systems has been recognized for many years. Considerable research and development has gone into labor market information (LMI) systems, which are increasing in salience commensurate with wider understanding of their value. Intelligent appraisal of upstream and downstream factors affecting beleaguered education and training systems, however, will require more than conventional labor market information, usually national in scope and derived from modern sector employing establishments. In the future, the data will need to be more localized, occupationally heterogeneous, and better suited to informal sector analyses. Interpretative capabilities will have to be more diagnostic, more probing, and more client-oriented.

Above all, the structure of basic and higher order skills and knowledge, and the interaction between these cognitive elements and experience over working lifetimes, will need to be reappraised technically. Job skills requirements and how these characteristics are changing as a function of new technologies must be more comprehensively understood, and composite skills and knowledge that are applicable over broad occupational spectrums must be identified. Faced with accelerating technological change in the occupational market place, individual career choice will become more flexible and require more information as people develop greater consumer awareness in restricted job markets. This agenda implies increased basic research, perhaps additional data (although costs are an important constraint), but certainly more effective utilization of data already available. In developing countries with rudimentary data collection systems in place, it may be possible to design new data series explicitly with HRD purposes in mind.

The next chapter reviews the current status of LMI systems in light of these issues. It explores the relevance of these systems to the more integrated HRD approaches being contemplated for the future. Definitions are provided for some of the key concepts. In particular, the chapter discusses the critical role of continual "scanning" of labor market conditions, particularly occupations, and interpreting these factors to the various constituencies concerned to produce more informed decision making at all levels.

2. Occupational Information in the HRD Context

Concepts and Definitions

The previous chapter provided a rationale for improved labor market and other related information for the purposes of developing intelligent and coordinated HRD policies and for supporting more knowledgeable individual occupational choice. The present chapter provides an international overview of the availability and use of this kind of information within the HRD context. First, however, the discussion must be anchored by defining some of the major concepts.

The first definition needed is of the term "human resources development", since the fundamental issue underlying the problems presented earlier is the need for a more strategic and integrated approach to HRD that would be dependent on more diagnostic and analytical appraisals of both macro- and microeconomic phenomena. In the U.S., the term has stemmed from the human capital approach in neoclassical economic theory. From a public policy perspective, HRD generally has been problem-oriented and distinguished by two types of programs, preventive and remediative (Sum, Amico and Harrington 1986). The first type has focused on mainstream education and training, with emphasis usually on vocational skills, attitudes, and experience. Its goal has been to provide adequate grounding for initial exposure to "the world of work" in the context of traditional career development models (see Super and Hall 1978; Crites 1969; Osipow 1973; Lawrence and McAdams 1978). The second type has been geared toward those who for a mix of reasons are somehow perceived to be disadvantaged, underutilized, or lacking in the necessary skills for productive employment, and who therefore require remedial (usually short term) assistance. Private sector HRD strategies have been somewhat more broad in scope in that they have dealt with all levels of functioning and of personnel (albeit within the firm) and have also included considerations of human resources utilization, planning, and management, as well as occupational development, compensation, safety, and welfare (Milkovich and Glueck 1985). Other definitions of HRD in both public and private sector usage have been limited simply to training, typically in occupational settings.

In the U.S. therefore, the overall drift of the HRD terminology and of programs associated with the term has been either in the direction of solving problems of underdevelopment or narrowly confined to occupational training. Coordinated intersectoral approaches to promoting effective development of the nation's human resources as a whole are absent, despite continuing and extensive criticism of U.S. education and training systems, for example, for their generic lack of adjustment to major socioeconomic and particularly work force changes. There have been increasing suggestions that, for example, "education is perhaps the most prominent area where our Nation's shortcomings threaten to impose enormous long term costs", and that despite

spending more per student than other industrialized nations, the U.S. is falling behind other countries in this regard (e.g. Joint Economic Committee 1989 p. 19).

Typically these kinds of statements in Congress and elsewhere have been made in reference to government/private sector cooperation in Asian countries such as Japan, but are not confined only to that region. Reubens (1983) cites an interview with a West German economist and Member of Parliament who commented on the mismatch in skills supplied and skills demanded in the U.S. as follows:

> I have some doubts whether today's educational system in the United States really is appropriate to meet the challenges of structural change.... there should be a coherent policy to link the educational system more closely to the economic system.... (p. 306).

Differences between the U.S. and West German approaches to HRD notwithstanding, there appears to be support for greater linkages between education and its potential outcomes in the workplace and for aggregative, rather than fractionated, approaches to HRD.

The Joint Economic Committee itself, in noting that the high dropout rates and unacceptable levels of illiteracy are sapping the potential productive strength of the U.S., states that "a skilled workforce is a prerequisite for long-term economic growth ... the workforce of the next century must be educated now; delay will be felt in reduced economic performance for years to come" (1989 p. 64). Accordingly, the Committee concludes that "education must be viewed comprehensively" to lay "a sound foundation for economic growth", emphasizing in its report both pre-education factors (early childhood development and health) and post-education factors such as workplace technology and occupational employment.

UN agencies have discerned this movement in the developing world over the last decade. The International Labour Office (1987) has noted the need for a "more workable and integrative concept of human resources development" (p. 10). The ILO also emphasizes the multisectoral framework within which such a coordinated approach should be considered, including, for example, population, education, health, and employment (p. 2), which accords, for example, "due recognition to the interactive processes between demographic and socioeconomic systems" (Thamarajakshi 1988).

The Economic and Social Commission for Asia and the Pacific (ESCAP), working with several Asian countries and other UN organizations, has operationalized some dimensions of an integrated HRD approach through the Jakarta Plan of Action. They have also gone one step further by promoting not only multisectoral but also multinational cooperation throughout the Asian Region in HRD planning (ESCAP 1988) with a strong core of LMI, as discussed below. Other regions such as the Arab and African countries are also pursuing similar regional strategies.

In exploring new directions for strategic planning in education, UNESCO has proposed more flexible, information-based, and participatory processes that are alert and

continuously responsive to signals from their environments (Lourie 1988). UNESCO also has documented (1987 p. 9) operational links initiated in Africa by the 1982 Harare conference between educational and economic planning as steps in the direction of more integrated development.

UNDP has drawn attention in several recent statements to: the reduction in support for HRD (1986 p. 3) as contrasted with the burgeoning awareness of its centrality in development policy (p. 4); the need for coordination between sectors for more comprehensive HRD strategies (p. 14); and the serious lack of such strategies in country programming decisions (1988 p. 3). In particular, the shortage of the necessary information for HRD planning is underscored:

> Disaggregated data [are] lacking on skill availabilities and needs, labor force participation rates, wage rates and incentives needed to correct labor market imbalances and the comparative efficiency of different educational and training systems (formal and informal, public and private, overseas and in-country, institutional and enterprise-based). In the absence of this information, projects can be initiated which cannot be sustained over the long run, and training systems produce skills which cannot be easily absorbed into the economy. (1988 p. 4)

The concept of HRD put forward in this paper is therefore based on the coordinative strategic models suggested above, and the premise of the paper is that various kinds of information, and particularly occupational information, are needed to make HRD strategies effective.

The three basic elements of a working definition of integrated HRD are: 1) acquisition/improvement of skills and knowledge, 2) productive application of skills and knowledge, and 3) adequate opportunity/sustenance for both of the above. Each is described in more detail below.

- An integrated HRD strategy must provide for *initial acquisition or improvement* of individuals' skills and knowledge for performance of socially or economically contributory roles in a community or society. These roles may or may not be for direct economic compensation, but should be geared towards a "value-added" contribution to the larger group, community, enterprise, or society of which the individual is a functioning part. Thus the acquisition process may be pre-service and formative prior to taking up a particular role or in-service as part of further self-improvement with an ongoing position or role in mind. The improvement process will be staged but probably continuous over the life span of the individual, may consist of fresh acquisition of new or "refreshment" of existing skills and knowledge, and may be formal, as, for example, part of the structured educational system, or informal, such as learning on the job or from others in a household.

- Enhancing *productive application* of individual skills and knowledge in mutually rewarding ways for both individuals and the agency, establishment, or community of which they are a part is another crucial element. This implies not only coordinated employment policies but also effective human resources management, particularly in occupational settings. Since most individuals work for the majority

of their lives, employment and labor policies are particularly relevant to this element of HRD; but it should not be forgotten, for example, that chosen roles may not be occupational (in the sense of working in a formal job-setting for wage, salary, or other economic compensation) for a number of reasons (e.g. motherhood) and that societies will also engage in HRD strategies to support such non-occupational roles for the mutual benefits that will result.

- A third element is the promotion of *equitable opportunity and sustenance* for both optimum learning of skills and knowledge, as well as their subsequent application in chosen roles; this implies improving opportunities for access to schooling, training, and employment, supported by maintenance of adequate health and nutrition levels for both learning and performance, and the need for reasonably occupationally supportive, safe, and healthy physical and psycho-social dimensions of the workplace. This implies HRD policies that articulate educational, training, employment, economic, health, and environmental aspects of human learning and performance in more integrated and mutually supportive ways.

From this perspective, HRD therefore seeks to support improvements in the autonomous and contributory functioning of individuals within their own chosen roles and status hierarchies, whether they be mother, philosopher, tinker, sailor, partially disabled, young, or old. The ultimate goal of HRD will be to promote socioeconomic autonomy and development as well as productive and fulfilling roles for all individuals so as to provide mutually rewarding outcomes both for the individual and the larger group or community. Thus there are a number of "mutualities" in this approach to HRD: between the individual and the community, enterprise, or society; between individual and employer; between individual and environment; and between the various agencies and organizations/enterprises (education, labor, health, employers, community) involved in implementing HRD efforts. These complementarities should be increasingly articulated in future HRD policy.

With this integrative, comprehensive concept in mind therefore, the working definition of HRD for the purposes of this paper is:

> *activities, policies, and programs that support and sustain continuing acquisition of skills and knowledge, and effective utilization of such skills and knowledge in ways that promote individual autonomy and are mutually beneficial to individuals, the community, and the larger environment of which they are part.*

Implementation of successful HRD therefore requires strategic coordinative alliances between different and often competing components in both public and private sector agencies. In particular, HRD must be informed by continuous and relevant information on the HRD environment and, most importantly — in view of the centrality of productive employment as the engine for socioeconomic growth — on the work environment.

Three types of job-related information are needed to support intelligent HRD policy and planning (Lawrence 1988):

- socioeconomic information: relating to the demographics, aspirations, choice, conduct, management, compensation, and products of people working;
- labor market information: concerning long- and short-term characteristics of, or factors affecting, labor supply and demand in the context of operations of discrete labor markets (both formal and informal); and
- occupational information: or information pertaining to occupations as they reflect actual jobs.

Occupational information is thus a subset of labor market information and is defined, in contrast to a larger economic intelligence system of which it is a part, as:

> *job-related information that can be associated directly with either single or aggregate occupations.*

The empirical unit of analysis for occupational information is actually the "position", which is defined as:

> *an actual or potential set of work activities associated with a specific job at a designated work location.*

The relationship between job and occupation is hierarchical; the job is defined as "a position or group of positions with identical or highly similar work activity dimensions" (see McCormick 1979), and an occupation as a class or group of jobs that are classified into an "occupation" on the basis of similarity of work activity dimensions across different work locations. Occupational information is thus pivotal in bridging the gap between aggregated labor market data emerging, for example, from macroeconomic research and the micro-position data of most interest to individuals making job-related decisions concerning either education/training or actual employment. The occupation is the most cost-effective informational unit of compromise yet devised therefore to transmit job-relevant information in the context of labor market behavior.

One limitation of these definitions and concepts is that they are derived from highly private sector-oriented and industrialized work settings and concepts of "occupation". Accordingly, they need constant reappraisal in terms of the changes taking place in the way individuals perceive, prepare for, and perform work as a function of new technologies in the industrialized world, and the differences in non-industrialized occupational environments encountered in the developing world, including work settings outside the formal, modern sector.

The remainder of this chapter explores the major issues and problems encountered in generation and use of occupational information in developing countries in relation to the concept of integrated HRD.

Occupational Information in the Developing World

In the international literature, discussions about occupational information tend to be included in more general treatments of LMI. Instead of serving the coordinated HRD approaches suggested above, LMI usually has been associated in the past with employment planning and more specifically, "manpower planning". Although in low esteem at present, manpower planning has not yet been adequately replaced by pragmatic alternative methodologies for diagnosing and responding to mismatches in the supply of and demand for skilled human resources.

Manpower planning has been used extensively both to provide an analytical framework and special techniques for assessing the market for occupational skills and to set specific quantitative targets for planning purposes at key points in the planning cycle. Both the framework and the use of the techniques for target-setting have drawn considerable and mostly well-merited criticism for two interrelated categories of reasons, political and technical.

From a political perspective, there are usually no coherent manpower policies within which periodic manpower studies can be designed or results interpreted. Yet traditional manpower research constituencies (e.g. research/statistical bureaus within labor ministries, or consultants) are often under pressure to produce quantitative estimates however approximate in the preparation of "plans" for HRD or other development purposes. Salient political decisions, such as authorization of public funds for the construction of a new education, training, or public health institution, for example, will require supporting studies confirming the community or national need as well as the actual or potential availability of the necessary skilled professional and support staff to run the institution. In developing countries, data to support conclusions for or against such decisions are in many cases rudimentary, and thus open to a number of potential technical challenges. Opponents or proponents thus are equally free to characterize findings as inherently untrustworthy, either at the source or following "expert" analysis. It is hardly surprising that manpower planning has not inspired much confidence in the political arena and is not "integrated or brought into the mainstream of national planning" (ILO 1988 p. 171). Credibility among potential users is thus a major criterion for improved policy utilization of LMI. Credibility, however, is associated with technical considerations of organizational coordination, data collection, analysis, and dissemination.

There is widespread evidence of *disorganization* among necessary organizational elements of what has been called the "conventional" manpower planning process (Richter 1989 p. 11).

> The situation which pertains in Tanzania seems to be a universal phenomenon. In any developing countries, the relationship between employment opportunities, manpower requirements and secondary school output is in a mess (Mugogo 1988 p. 11).

Among the reasons cited for this failure are "little coordination between economic planners, educational planners and manpower planners" and a lack of cooperation among the relevant ministries. Such cooperation as does exist seems "to be based mainly on good will of individual officials rather than ... structural arrangements".

The African Employment Report (ILO 1988) concludes with the following:

> ... the need for strengthening the institutional machinery in employment and manpower planning is specially important, so also is the enhancement of the technical capability of those engaged in this assignment. Perhaps more [important is] ... the need for coordination ... as many ministries and agencies engage in some aspect of HRD planning. The weakest link is between Ministries of Education (... the supplier of skilled manpower) and the Planning Ministries (which primarily determine the demand for skills). On the supply side a number of Ministries apart from Education, such as ... Employment, Labour, ... Productivity, ... Health are engaged in the training of skilled manpower. The lack of coordination between them often results in duplication of effort and wastage of resources (p. 203).

Similar problems have been noted in socialist countries, and in the USSR the system of education was recently characterized as "firmly at a dead end. Expanding secondary and higher education on the same old basis was utterly absurd, because college graduates were striving to take jobs that needed no higher education, while the shortage of trained workers continued to increase. The blame for this should not be laid on the education system alone ... " (Skorov 1988).

In Latin America, attempts to include assessments of manpower requirements in all educational plans was judged to have failed in part because of lack of mechanisms of coordination and cooperation across government agencies. "Even if one accepts the rationalist logic of the comprehensive planning approach to coordination, none of the countries in the region seemed to have the political will nor the organizational capability to both generate the required information and then implement the policies suggested by the analysis." (McGinn et al. 1985 p. 20).

Indonesia, for example, has "no coordinating machinery that allows the users of LMI to consult each other about information they should supply. Such a machinery could also greatly improve the use of data that is generated ... through administrative procedures but which so far is not analysed or published" (Swasono and Van Toledo 1986).

A recent study of efforts to upgrade LMI systems in four Asian countries (Richter 1986) noted that "in all countries visited, there have been informal contacts and consultations between governments, [and] employers' and workers' representatives on questions regarding LMI reporting and analysis for decision-making.... However, in no country has use been made of the institution of a steering committee to bring together government, employers and workers and other institutions/organizations/agencies concerned in order to consider jointly the conclusions and suggestions for further action.... and to pursue and monitor regularly a jointly agreed programme." (p. 21).

Richter goes further in a subsequent publication (1989) in stating that "no regional, subregional or national LMI seminar or workshop has gone by without strong suggestions and even exhortations about the urgent need for improving collaboration and coordination of main users and producers of LMI.... some progress has been made in some developing countries in this direction, but the overall picture is still one of lip-service being paid but little substantive and sustained action being taken" (p. 13).

Data collection and analysis problems with the manpower planning approach in developing countries are legion (see Psacharopoulos and Hinchliffe 1983; Little 1986). The lack of coordination documented above also affects the design, data collection, and analytical and interpretative frameworks for LMI. Thus the lack of early and continuing "stakeholder" involvement leads to differences between primary purposes of data series/instrumentation and the ultimate objectives for which the data are needed. This applies both to routine data series as well as one-shot surveys, and is not limited to the developing world alone. In the case of the U.S., for example, employment services collect data from employing establishments for determining unemployment insurance assessments; yet the data are used for a variety of additional interpretative and analytical activities they were not originally designed for. The *Dictionary of Occupational Titles* is designed for use by employment services in classifying job orders and applications, but is widely used as a vocational guidance tool outside the employment service offices. In developing countries, numerous labor market and manpower surveys are conducted by academics and others without clear ideas about specific purposes for policy making (Richter 1989 p. 15).

Most LMI data series and supporting occupational classifications are strongly formal-sector oriented. This bias is partly a function of translation of classificatory and other methodologies from industrialized nations that are slow even themselves to respond with new occupational and industrial taxonomies to profound changes in the structure of their own employment sectors. It is also a function of the extraordinary impenetrability of the informal sectors to traditional methods of classification, examination, and analysis (ILO 1988 p. 107). It has even been argued that "labor markets" in the usual sense of the term do not exist in many of the rural societies in Asia (Amjad 1986). LMI is also predominantly national in scope and directed towards employment (demand side) planning considerations with usually much less attention or involvement of other sectors, such as education or subnational agencies/institutions.

Occupations are the conceptual units into which data on individual positions are aggregated and within which numbers of employed persons by position are totaled to arrive at total occupational employment by type of occupation or sector. Occupational classifications, however, are often grossly imprecise, leading to the need for high levels of occupational aggregation for statistical reporting purposes and/or to large residual or general occupational categories such as "office worker", "manager", or "other professional". There may be wide differences, for example, between the skills requirements, job duties, and compensation of various civil engineers involved in field operations or central management; yet employment totals and therefore "manpower

demands" are typically calculated for "civil engineers". This use of aggregate categories weakens both descriptive and predictive capabilities of occupational information. In particular, in countries with large public sector employment, more importance is attached to the public service commission skills grade than the occupational title of the formal post, which in a recent manpower survey in China was found to be confusing, with skilled worker posts having titles that sounded like managerial posts (ARTEP 1988). Occupational classifications tend to be created judgmentally, and interpreted and used judgmentally. Qualifications data (educational requirements levels, prior experience) defined as general requirements for hiring into an occupational category may be widely variant in jobs within that category. There may actually be more variability within than between categories, calling into question the discriminatory value of the classification. In light of their centrality to HRD planning, the potential measurement error and other imprecisions in definition and use of such a key unit of analysis seems at present to be unacceptably high.

Analytical techniques such as forecasting involve fixed assumptions (which lead to perceptions of rigidity) and inevitable error, which, from a statistical point of view, can be divided by source (i.e. sampling v. non-sampling) and to some acceptable extent controlled for (e.g. larger samples), but which by the non-quantitatively oriented user is effectively interpreted as unwelcome inaccuracy. Economic shocks in an increasingly fluctuating international trade and commercial environment are probable but difficult to predict, heightening uncertainties associated with the assumptions necessary for forecasting or other models. One often cited problem, for example, is the use of fixed staffing pattern ratios in industry/occupational matrices to provide occupational employment projections from projections of total industry employment. This technique rested on the assumption that industrial staffing patterns changed relatively little over the medium term.

The one-shot, sporadic nature of traditional "manpower surveys" has had several negative consequences in the past. They have lacked either the standardization of methods, terms, and style or the routine "radar-like" scanning capability necessary for effective HRD diagnostics over time. They have tended to blitz recipients (e.g. employers) from different directions with repetitive and sometimes simultaneously duplicative requests. They have led to a norm of low response rates (and potentially unreliable or skewed responses) to such surveys, a problem which researchers and others have learned to accept as inevitable and which respondents understand reduces the credibility of the data and therefore of the results.

The ubiquitous shortage of adequate data in developing countries so often cited in refutation of manpower planning approaches furthermore has more than one aspect to it. Data may not be collected or may be inadequate or not yet available, thus limiting the potential user and setting up a situation where entrepreneurial consultants can legitimately offer one-shot, often repetitive, studies as an interim solution. *Dissemination* of LMI is thus crucial and has been traditionally criticized for essentially following deadlines of producers rather than users. Technical or staffing problems, even

after the introduction of microcomputers into the LMI analytical process, obstruct the publication of results until the data have become "largely irrelevant" (ILO 1988 p. 170). In Thailand, for instance, the absence of computer facilities within the relevant ministry and consequent reliance on manual or outside processing reduced the capacity to respond to users and diluted the credibility of the agency as a clearinghouse for scarce and valued information (Richter 1986 p.13). In Malaysia, "LMI programs seem to be plagued with a surplus of outdated material" (Alias 1986 p. 7).

In summary, and technical considerations aside, as noted in the case of India (Richter 1986), current problems have centered around the attitudinal and institutional aspects of LMI generation and use:

> LMI functions are still widely understood as a matter of interest to the formal wage-earning sector only, as a macro-level tool for the central policy makers and planners, and as a by-product of placement operations of the employment services. As a result, methods and techniques of data generation, analysis and dissemination in the field of LMI remain largely tradition-bound (p. 5).

In spite of these shortcomings, however, it is clear that in light of 1) the scope and breadth of HRD problems, and 2) the growing need for more diagnostic and analytical capabilities in the search for appropriate solutions, there is currently a resurgence in interest in LMI, particularly as it relates to occupational employment factors. For example:

> While traditional forms of manpower forecasting have been rejected by the majority of OECD countries, a gradual, although hesitant return to manpower planning emerges in several of them (Soumelis 1988 p. 14).

In Africa, "despite the general disenchantment with the manpower approach, conventional manpower planning still retains its intuitive appeal ... [and] ... new emphasis and orientations are gradually emerging within it" (ILO 1988 p. 175).

Accordingly there are several initiatives worth noting in the field. A major emphasis is now placed in many countries on replacing the one-shot, often expatriate consultant studies of earlier manpower planning approaches with more of an intra-organizational "radar" that can routinely and systematically scan the HRD environment for occupational supply and demand characteristics. The purpose of the radar analogy is to underscore the periodic sweeping or scanning function, rather than the widely spaced "snapshots" provided by traditional manpower planning. The questions of the design and location of the HRD radar units and the adequate preparation of observers/interpreters are still open. Initially, there is evidence that individual sectors are attempting to develop their own intra-agency units in response to sectoral adjustment shocks, such as energy (Richter 1989 p. 26;) or water supply (Lawrence and Stevens 1988). This trend, however, is counter to the need for more coordination discussed earlier, and there is a distinct need for the training of sophisticated HRD radar observers/analysts to go beyond exclusively demand-side considerations to more integrated approaches that incorporate, for example, "upstream" factors such as demographics, health information, and educational levels into labor force and

occupational employment analysis. The ILO Turin Center is an international UN training facility that has experience in this area and is currently exploring new avenues in LMI training.

One important concept clarified by Richter and others (ILO 1981; Richter 1984 p. 681) has been the specification and tracing of critical labor market "signals" for more continuous labor market analysis and reporting. These signals will vary depending on country and sector application, time, and those using the data; but they may include, for example, key indicators for policy purposes, such as occupational employment growth rates and skills patterns for designated "priority occupations" in Swaziland (Lawrence and Stevens 1988), wage scales and use of expatriates in the private sector (Psacharopoulos 1983 p. 71), labor force participation rates for females in Asian countries (Amjad 1986), or hours of work and income levels in the urban informal sector (PREALC 1986). While this concept is not new and is being developed into different avenues of specialty by the ILO (e.g. key informants systems and labor turnover surveys discussed below), the concept of labor market signalling has several advantages. It focuses on the communication, interpretation, and feedback aspects of the interaction between labor demand and supply. It suggests more recursive than sporadic assessments of the data. Most importantly, it implies diagnostic adaptability and more situational responsiveness than has been typical in labor market information systems in the past.

A variant of this approach is to identify key "stakeholders" in the HRD process and explicitly involve them in determining what signals to attend to in the informational networks available (Lawrence, Tomaro and Braddy 1988; Lawrence and Stevens 1988). This method was justified in the context of education, training, and employment in the Swazi water sector as follows:

> Without cohesive HRD policies, personnel movements remain haphazard, often undocumented in the necessary detail, and often subject merely to the whim of managers. Without clear HRD management strategies based on accurate occupational information, pre-service education and training will remain unresponsive to workplace needs and inefficiencies will result.... In-service training then becomes prized often beyond its actual value in improved employee productivity. As a consequence, much of the necessary applied training is carried out on the job, placing unanticipated responsibilities on immediate supervisors and co-workers. In technical areas involving construction, supervision or maintenance of large public [water supply] facilities [e.g. dams], such inefficiencies can be disastrous.
>
> Skills gaps between job requirements and the qualifications and experience of those actually employed in those jobs are also expensive in terms of time and other resources in the short term. In the longer term, the risk is magnified for both employees and managers, in that those who are trained largely on the job are likely to be less flexible and less adaptable to retraining because they lack the more generalizable skills and basic competencies in the first place. The result is creation of pools of employees who are only marginally capable even after considerable experience and specific on-the-job training and who find it difficult to adapt or progress as their jobs or responsibilities change over time. (Lawrence and Stevens 1988 p. 55).

As a consequence, stakeholders in various ministries and agencies, such as education, health, natural resources, labor, and public service, were formally involved in selection of critical occupations and occupational characteristics (e.g. type and level of qualifications, hiring process, and in-service training by occupation) for initial assessment and longer term monitoring within the sector.

Because of the centrality of the informal sector to future HRD planning in the developing world, it will be essential to improve our techniques for deriving occupational information from this type of employment, particularly in rural areas. It may be necessary, however, to shed or radically adapt certain conventional distinctions, such as occupation, career choice, full-time versus part-time work, and "acceptable" working conditions. Profit-making is often less important than immediate survival, and there is substantial evidence for routine operational losses in informal sector activities (ILO 1988 p. 126). Migratory movements from rural to periurban areas or across provincial or national boundaries are routine in much of the developing world, but they are extremely difficult to measure.

One initially promising approach to developing occupational information on the informal sector is the "key informants" survey technique developed by the ILO (1981, 1982). This method rests on the common sense assumption that there exist individuals in each community who, because of their standing, experience, and knowledge of local conditions, will serve as effective information sources on labor market operations in that area. Examples of such informants might be major employers or workers in a particular occupation or sector under study, or local farmers or teachers who are long-time residents and perceived as particularly knowledgeable about the employment situation in the community or region. Emphasis has been placed on the qualitative aspects of this source of LMI and on its application as supplementary to quantitative data where possible. Skepticism has naturally been raised concerning potential selection bias of respondents and reliability and validity of responses to these types of surveys, as well as a more subtle association with underdevelopment and corresponding lack of sophistication. One danger noted in an analysis of key informant surveys in 12 Asian countries was the tendency to lock onto this approach as a low cost "statistical surrogate" for more rigorous quantitative techniques (ILO 1982 p. 81). Recalling the similar arguments effectively directed against the conduct of employer surveys in U.S. occupational employment studies some years ago, it is easy to understand the criticisms. However, analysts familiar with either econometrics or highly quantitative survey design also understand both the high cost and the false precision often associated with attempts to apply "scientific" methodologies in the area of occupational employment research. As a complementary source of information, particularly in areas where other data are difficult or impossible to come by, this approach therefore remains a potentially useful and important contribution.

Follow-up or tracer studies are another widely used method for determining the occupational employment and other job-related information of graduates from education/training systems. These, however, have the inherent disadvantage of

focusing on initial employment, which tends then to become an evaluative measure of the success or failure of (for example) vocational education or training programs, thus implicitly encouraging the potential tracking of students into specific occupational employment. Longitudinal scanning of occupational employment by educational level, while more expensive, can yield crucial empirical information on occupational mobility, wage changes, and job responsibilities and security. These data, when associated in the longer term with educational programs, can give a much more comprehensive evaluative picture.

As microcomputers become more widespread throughout ministries concerned with HRD, and interest in programming and interpretative skills become more developed, there is a perceptible increase in modelling/simulation for planning purposes even in some of the poorest countries. While models are embryonic at present, and often plagued by lack of data with which to load them, the flexibility of the microcomputer and its sophisticated display and presentation mechanisms are arousing substantial support for these techniques. Correspondingly, quite extensive research and development work is ongoing in the U.S. on educational planning models for application outside the U.S., with demographic as well as labor market components of direct relevance to generation and use of LMI. While the necessary data may not now be available in many countries, neither the design nor the implementation of such modeling capacities is hampered by extensive preexisting regulatory or proprietary frameworks such as have inhibited the analytical interpretation of establishment employment surveys in the U.S. The opportunity to shape future LMI systems with broader HRD purposes in mind and the prospective tailoring of data collection explicitly to more comprehensive HRD planning are intriguing possibilities and may foster in the foreseeable future more of a South/North direction in the LMI dialogue.

Finally, the search for key labor market signals or indicators has been extended into detailed establishment surveys of occupational employment turnover. This was introduced experimentally in Malaysia in 1979 and has focused on high reliability at low cost (Alias 1986). Accentuating timeliness (a quarterly survey reported biannually) and selectivity (10 labor market areas, 1000 private sector establishments, 28 industries, and 256 occupations), this method obtains data on gross movement of workers (rates of occupational engagements and separations per 100 employees) as a means of detecting regional differences and imbalances between occupational supply and demand. These labor turnover rates have been found to serve as useful indicators of national occupational supply/demand shifts over the 6-year period reported (p. 23). The data have been useful to employers, training institutions, employment service personnel, vocational guidance counselors, and the job seekers themselves. Difficulties have included usual technical problems of definition of the appropriate sampling frame and characteristics of the statistical "population" of occupations, as well as determination of criteria for competitiveness defined as individual occupational transition through resignations and rehires. Most interestingly, however, major reservations are reported by users who still seek conventional occupational employment forecasts, and who are

uncomfortable with the proxy, though cheaper and faster, information provided by the labor turnover surveys.

In general, it can be concluded that the role of occupational information in future HRD planning in the developing world is gaining in significance. Policy makers stand to benefit; so do those individuals wishing to make more informed choices about occupational preparation and employment. Opportunities abound for creative and cost-effective solutions to the need for more routinized scans of the occupational environment. The next chapter outlines the relevance and potential contribution of the NOICC/SOICC Network to this situation.

3. Relevance of the NOICC/SOICC Network to Development Assistance

The purpose of this chapter is to summarize the course of recent developments in occupational information systems within the purview of the NOICC/SOICC Network in the United States in relation to the discussion in the earlier two chapters. In tracing the reasons for establishment of the Committees and their functions, as well as some of their accomplishments, we can see parallels with issues raised in the contemporary environment of the developing world.

Review of the U.S. Context for NOICC/SOICC

The NOICC/SOICC Network has been described by one who was closely involved with its initiation by the U.S. Congress in 1976 as "a unique experiment in Federal-State interagency cooperation with a very important purpose: to improve, rationalize and consolidate the scattered, incomplete and disjointed elements of LMI into a coherent and usable occupational information system (OIS) functioning in every state and territory" (Radcliffe 1984). To understand why it is unique, it is useful first to review the overall context for LMI in the U.S.

As in less industrialized nations, the U.S. has been faced over the last decade with exacerbated HRD problems necessitating better information flows for it to respond effectively. The National Governors' Association documents the concern with maintaining acceptable levels of economic growth, employment, equity of economic opportunity, and reduction of poverty (Sum et al 1986). In combatting these difficulties, the U.S. Congress has demonstrated support for the provision of various kinds of labor market information programs and, increasingly, for tying these programs into a coherent whole for more integrated HRD planning.

The concern about systematizing occupational information in HRD planning has been directed predominantly at sub-baccalaureate education and training: "without such a system it is impossible to intelligently plan and evaluate vocational education and job training programs costing billions of dollars each year", or to effectively help "students and adult workers to plan careers or prepare for employment in a fast changing job market" (Radcliffe 1984). The targeted constituencies here represent but a subsector in the set of HRD stakeholders and approach defined in earlier chapters, reflecting continuing U.S. preoccupation with the three out of four American jobholders — the "neglected majority" (Parnell 1985) — who do not complete a 4-year degree. There are signs that uncertainties in the multiple labor market environments in the U.S. are beginning to expand the scope of occupational information systems beyond the vocational education/employment training purposes envisioned here. Some state

systems (Maine, for example) have pioneered wider inclusion of economic development information in their systems, and NOICC has announced plans to move further in this direction nationally (NOICC 1988 p. 20). This mirrors parallel initiatives in some of the more experimental steps being taken in the developing world, for example the extension of the role of economic planning and development agencies at federal and state levels in LMI generation and use in Malaysia (Alias 1986; Richter 1989 p. 48).

The types of "rational" economic planning assumed to be supported by these approaches (e.g. Sum et al 1986 p. 4-2) are problematical and have often been criticized in the U.S., as in other countries (McGinn et al 1985). The federal government in the U.S. currently takes a less aggressive role in educational and training planning than it did in the 1960s and 1970s. Then as now, however, it was recognized that at whatever level of government the tough decisions (e.g. tradeoffs in allocation of scarce public resources) will have to be made, the diagnostics required to inform such decisions will increasingly need data.

For the decade before the 1976 Congressional legislation, several reports documented the shortcomings in the availability and use of work force data for vocational education planning and evaluation. The National Advisory Council on Vocational Education noted little effort to respond with occupational programs to critical national shortages (NACVE 1968) and then cited weak occupational employment projections, gaps in supply and mobility data, poor dissemination, and lack of interpretative expertise as factors inhibiting vocational education planning (NACVE 1972). Other studies suggested low levels of data use except where needed to comply with statutory requirements for federal funds (Lecht 1971; General Accounting Office 1974). Perhaps the most definitive, however, was a national study in 1974-5 commissioned by the National Institute of Education (Drewes and Katz 1975). Assessing in detail factors affecting availability and use of "manpower data" in each of the ten federal regions in the U.S., the study concluded that lack of awareness or general distrust of available data led local institutions or planning agencies to seek their own data from more trusted sources (such as local advisory committees or surveys) or to ignore such information altogether. By the producers of much of the demand-side information (local employment service offices), the problem was seen as largely one of insufficient resources, as well as general unawareness in the educational community, for example, of technical limitations in "customized" disaggregations to school district levels of statewide data (p. 90).

Among the recommendations of the study were:

- assured Congressional funding in the forthcoming 1976 Educational Amendments for a comprehensive LMI system on a nationwide basis for public use;
- establishment of an InterAgency Information Coordinating Committee, consisting of appropriate agency heads in the labor and education sectors;
- increased training for interpretation and use of LMI in program planning; and

- technical specifications concerning such aspects of the data as, for example, standardized data element definitions, follow-up procedures, and crosswalks on the supply side, and local area industry/occupation matrices, standardized industry employment projection methods, and occupational clusters on the demand side.

In furtherance of the more coordinated HRD approach implicit in the study recommendations, the Information Coordinating Committee was originally proposed as either being advised by or having the ability to empower technical ad hoc committees to include other major "stakeholders" from what were then the National Commission for Manpower Policy; the departments of Health, Education and Welfare, Commerce, Agriculture, and Defense; and the Veterans Administration (Drewes and Katz p. 135).

One of the unique factors in the proposed, as well as the actual, NOICC/SOICC structure has been its organizational framework as an interstitial working group or mechanism for cooperation between potentially competing constituencies in the HRD arena. Although the recommendations to Congress had specified regional coordinating committees, the 1976 legislation extended the structure instead to the state level. Consequently, states are required to have SOICCs as a condition for receipt of federal vocational education and job training funds. The five state level statutory members are: the state agency receiving federal vocational education funds, employment security, vocational rehabilitation, the economic development agency, and the job training coordinating council. States may augment this membership with other relevant state agencies as they deem appropriate. At the national level, the initial legislation included only four agencies as statutory members, two from Labor and two from Education. In 1988, there were nine statutory members at the national level, (four from Education, two from Labor, and one each from Agriculture, Commerce, and Defense).

This organizational establishment and growth can be interpreted as an index of several trends, including the increasing awareness of the importance of occupational information in public sector functioning in the U.S., the adherence of NOICC to its principle of interagency coordination and consensus-seeking, and the continuing commitment of Congress to support of the NOICC. Six separate pieces of federal legislation in the intervening period have cemented the framework, and in recent years there have been efforts explicitly to cross-stitch vocational education and job training legislation in the area of LMI.

At the center of the legislation has been the concept of targeting to the LMI needs of special groups, as well as promotion of the occupational information system as the mechanism for meeting common information needs of vocational education and employment/training programs. NOICC's mission has been developed through interpretation of the successive legislative acts, most recently the Carl D. Perkins Vocational and Applied Technology Education Act (1990), as have the missions of individual SOICCs, many of them with supporting state legislation. To the extent that these can be interwoven into a common "Network" mission, it has become bifurcated into two major components with one overall goal:

to improve communication and coordination among developers and users of occupational information, particularly vocational education and employment and training program managers, and individuals exploring occupational options and making career decisions (NOICC 1988).

The first of the two components are the occupational information systems as computerized data bases providing the foundation for the diagnostics essential to informed decision making at any of the various constituency levels outlined above. The second are career information delivery systems, which package the information into customized (computerized) formats for access by and/or dissemination of the information to individuals interested in comparing personal characteristics to relevant occupations. In connection with these two basic components, the Network has the potential for making contributions and delivering services in three areas:

- fundamental technologies and methods, such as organizational/management, systems design and operation, and specific analytical techniques, such as "crosswalking" between classifications;
- products, such as packages, documentation, and software; and
- technical assistance, training, and consultation.

The following are some examples of each of these three types of outputs.

Technologies and Methods

An important technology in improving LMI and fostering its use in HRD decision making is the organizational structure with which to fund and manage LMI operations in the public sector. As already indicated earlier, the inability of many countries to orchestrate their own systems successfully can often be traced to lack of adequate coordinative mechanisms for effective day-to-day operations.

The interagency aspect of the NOICC/SOICC organization, while presenting its own special problems for operational management, is one of its major strengths. It builds on some of the best dimensions of the federal/state cooperative model of the U.S. Employment Service (a major LMI producer as well as user), with the goal of providing the necessary individual autonomy to adapt to special state and local circumstances, but maintaining some degree of vertical integration of methodologies and standardization of classifications essential in any functioning system. More importantly, it augments vertical (federal/state) cohesion with additional horizontal breadth by increasing the number of agencies both formally and informally involved at each level.

At the foundation of the U.S. network is continued federal legislation providing broad direction, establishing policy guidelines, and most importantly, basic funding. While legislation itself may not ensure effective coordination, the index of Congressional

commitment through repeated reauthorization and appropriations has been a notable incentive. Figure 1 (below) illustrates the levels of federal funding for NOICC and for SOICCs from 1981 to 1987. The first column of the bar chart illustrates the Congressional funding of the NOICC. The second two columns respectively indicate the basic assistance grants to states (BAGS) and the "other" assistance grants to states for special projects such as specialized systems for delivery of career information or developmental studies.

These data demonstrate a relatively steady if modest federal funding commitment to the concept of coordination in occupational information generation and use. This level of support does not reflect either federal or other funds allocated to the data collection and analysis programs.

The data in Figure 1 also show a steady increase over the last 3 years in flowthrough funding from NOICC to the SOICCs, mirroring the recent federal intent toward decentralization of HRD approaches. This cooperative effort between federal and state

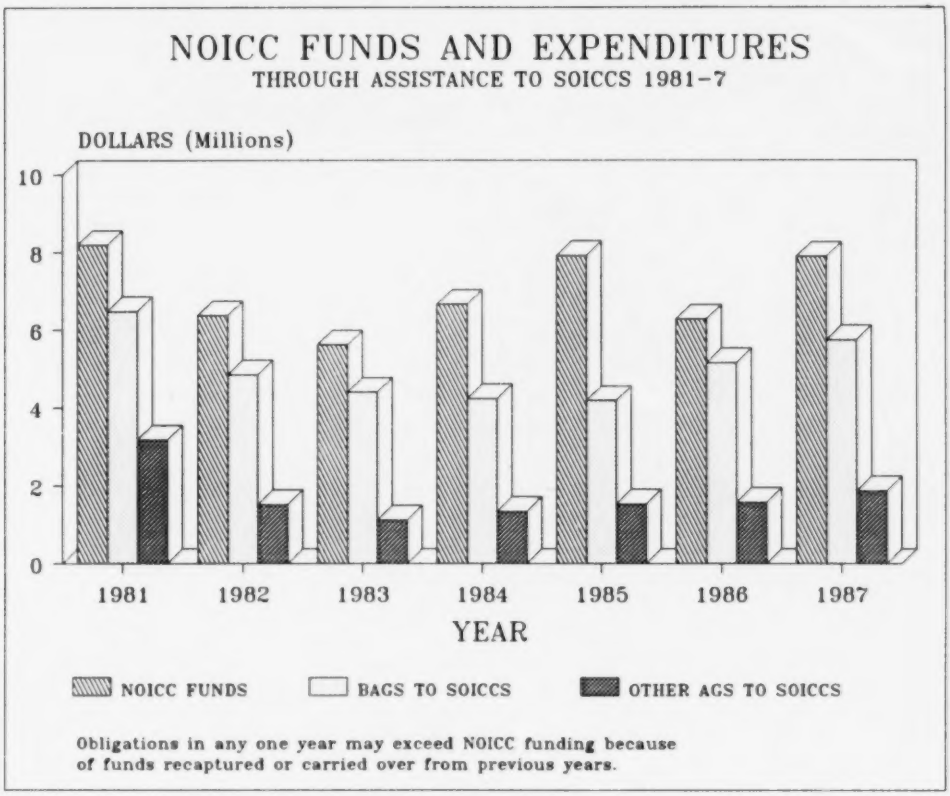

Figure 1

levels has resulted in some notable technical initiatives, which include both the information systems in their various forms and ancillary packages to assist the analyst or user.

Technology has, of course, affected the information-processing aspects of OIS development in profound ways over the last decade. Pervasive microcomputer availability has brought relatively large data bases and sophisticated techniques within desktop reach. About three-quarters of the states now have a microcomputer version of an OIS in operation. The OIS varies by state according to specific applications, reporting formats, or planning specifications unique to the state. NOICC, however, has provided technical and fiscal support for the generation of a conceptual model (NOICC 1981) and subsequent menu-driven software. These systems may contain data from several different sources on occupational supply and demand, including an array of occupational characteristics (e.g. working conditions, requirements, earnings) and other complementary aspects of occupations (e.g. institutional or programmatic sources/types of training). They vary in the extent to which they penetrate substate labor markets or provide additional demographic or economic development information. States may generate occupational employment estimates directly or indirectly for major metropolitan areas and substate regions. They may include population data or industrial location information such as available housing, office space, and commercial siting and infrastructural data.

States now are able to complete their own occupational employment projections to the year 2000 at the state and substate level. The system estimates total job openings due to employment growth and separations for each occupation or occupational cluster. Current employment data are provided by routine federal/state cooperative surveys of occupational employment according to standardized methodologies. Projections are derived using the industry/occupation matrix projection method referred to earlier. The flexibility, reduced costs, accessibility, and availability of these projections are major improvements in comparison with the expense, complexity, and elaborate priority queueing mechanics of the original (though pioneering and invaluable) mainframe systems.

At the heart of the OIS is the classificatory unit known as the "occupation", around which the entire system is constructed. As a function of the heterogeneity of the American workplace, as well as the different interests of public agencies concerned with different aspects of occupational employment, there are at least ten major public sector occupational classification systems currently in use (Lawrence 1988). Consequently, in 1983, NOICC established the National Crosswalk Service Center (NCSC), currently operated by the Iowa SOICC. The Center maintains and operates computerized systems that link the different classifications. This is a difficult task both technically and conceptually, suspended uneasily between the pragmatics of day-to-day operations on the one hand and the lack of strong current theoretical or empirical underpinnings for most of the classification schemes on the other. In addition to maintaining updated versions of the standard "master" crosswalk files in machine readable and hardcopy

format, the Center provides SOICCs and other public or private sector users with substantial crosswalking services (such as descriptive or analytical runs by *Dictionary of Occupational Titles* variables harmonized with other classification systems). Because of their basic client-orientation and their familiarity with not only the individual classification systems themselves, but especially the inherent incompatibilities and unique characteristics of each that are discovered in the crosswalking process, National Crosswalk Center staff constitute an invaluable troubleshooting and developmental resource to the Network.

Parallel to the OIS activities are commensurate efforts to package the information from the OIS in ways that inform without intimidating users who are interested in making or helping others make personal decisions related to occupational training or choice. Typically differentiated as career information delivery systems (CIDS), these packages exploit the interactive capacity of the microcomputer to provide on-line responses to user queries on relevant occupational characteristics. Within the limits of the system, the definition of what is relevant can be defined by the user, but can include, for example, anticipated job requirements, wages, distribution by industrial sector, and current and projected employment demand. Because of the potential applicability, utility, and outreach possibilities of this medium for information dissemination, it is especially important that first time users are positively reinforced for using the system. Thus much design work goes into easing the interactions between user and database, leading also to a proliferation of proprietary systems marketed quite aggressively in the guidance, counseling, and vocational rehabilitation fields. As of the 1989 NOICC reporting period, computerized CIDS were operational in the public domain at approximately 16,000 sites in 48 out of the 50 states (NOICC 1989 p. 3).

Products

The major products from the NOICC/SOICC structure are the systems, frameworks, and technologies themselves. The basic OIS model has been adapted to a reasonably standardized format, but one that also can meet individual states' needs. The transition from predominantly mainframe to microcomputer data manipulation and output into a variety of different dissemination modalities has been a notable move forward in making the previously arcane and relatively inaccessible LMI from federal/state cooperative statistical programs available to more users. Substantive improvements in technical aspects of the data, such as more comprehensive models for estimating industry employment projections, and the substitution of state for national occupation-specific separation rates have refined the quality of state systems. The earlier reluctance and primarily "compliance" bias documented above regarding use of the data are beginning to give way to a rather different attitude of more active engagement in LMI use on the part of secondary and postsecondary education and training agencies and institutions (Lawrence and Bergman 1984). Continued Congressional insistence upon supporting evaluative data for appropriations decisions, as well as the pervasive changes sweeping the American occupational spectrum, are likely to further stimulate and enhance both

OIS and CIDS development in the future. The underlying shortcomings in the data need to be addressed, taking advantage of analytical software and modeling capabilities increasingly available in microcomputer format, as well as more cross-fertilization through additional linkages with private sector data bases such as DRI and Dunn and Bradstreet. The field stands to gain immeasurably through such a potential contribution to a genuinely innovative technology of HRD information diagnostics and interpretation.

In addition to exportable products such as the projections systems, of immediate potential significance to systems development in other countries are products such as the *OIS Handbook* (NOICC 1981), which provides the underlying rationale and system specifications for OIS design. Although *prima facie* skewed too much toward the industrialized modern and private sector for some developing country applications, the *Handbook* articulates an operational structure for public sector occupational system design based on routine statistical series such as establishment and household surveys. It explains the basic informational components of the system and how they interrelate, with annotated technical descriptions of sources and methodologies. Not only does the *Handbook* thus establish a tested empirical framework for system design but it also serves as a potentially useful tool for guiding the development of country-specific materials for use in training agency staff. Complementary publications deal with issues of supply-demand comparisons and clustering of occupations for analytical purposes.

Training

Associated with the NOICC/SOICC role in system design and the requisite new technologies for OIS implementation has been a continuing need for training at all levels. After the passage of the 1976 Amendments, since there was little in the way of systematic relationships between major components in the proposed OIS design process, training focused primarily on fostering the new liaisons set up by the legislation and on exploring common ground in understanding technical issues in LMI provision and use. For example, the first national LMI training workshop for joint participation by educators and employment security personnel under the new NOICC/SOICC legislative umbrella was keynoted by Congressional staffers who had worked on the legislation and could speak to its intent. LMI definitions were collected into a dictionary format, and discussions centered on employment security operations regarding the cooperative federal/state LMI program and its relevance for educational planning (Lawrence and Whitney 1977). In the main, the training took two broad directions. Employment security personnel, usually from a Labor Department perspective, addressed "demand" side issues, with emphasis on the technical considerations related to data collection, analysis, and interpretation for the educational representatives, who varied from some to almost no knowledge of these considerations.

The educators at that time focused primarily on their role as information users, although their responsibilities as data producers on the "supply" side were explicitly recognized.

They communicated a need for information output geared specifically to their needs, by time period, by geographical level, and by occupational unit that could be related usefully to programmatic design and process. This early characterization of the relationship thus cast the employment service primarily as producer/technical and the educational agencies as the less technically oriented user. Since that time, there has been a wider understanding of the previously arcane LMI system operations, increasing recognition of the technical aspects of educational agencies as producers, of the difficulties and limitations of straight one-to-one program to occupation matching, and of the importance of micro-data at various levels of disaggregation to meet local (substate) needs.

Training has typically followed major documentation development or new steps in system design. Regional sessions were held, for example, to introduce the new *OIS Handbook* to states. When *Vocational Preparation and Occupations* (the precursor to the NOICC master crosswalk) was published, training sessions illustrated its use in interrelating data from different occupational and educational classifications. Following release of documentation explaining a clustering approach to supply/demand analysis, training sessions and technical assistance were provided at several sites.

A comprehensive training approach was incorporated into the expansion of automated OIS in the early 1980s. NOICC, national associations, and federal agencies collaborated in producing an extensive review and update of basic LMI sources and concepts. The purpose of the effort was to improve data use in state and local level program planning and evaluation and to enhance cost-effective state and local training capabilities. The "multiplier" training-of-trainers mechanism was used to form teams competent in generic approaches to HRD planning using LMI. Minimum 3-day sessions centered around prescribed training materials, which presented fundamental concepts as well as tailored scenarios in case study format permitting direct application of training experiences to actual local situations. This documentation is summarized in Sum (et al. 1986), signifying an important step in the direction of increased integration in HRD strategy, albeit with the initial definitional constraints of the more preventive or remedial interpretation of "HRD" mentioned in chapter 2 of this paper.

4. Conclusions and Recommendations

The foregoing has outlined the context for and initiatives in LMI preparation and use in the developing world and has presented an overview of the U.S. experience with its 13-year-old NOICC/SOICC Network. This chapter draws some conclusions as to future directions in the use of LMI in HRD planning and offers some suggestions for NOICC/SOICC consideration.

Summary and Conclusions

Worldwide, serious human resources problems provide a menacing backdrop to efforts directed toward stable economic development and improvement of the quality of life for all individuals. The specifics of these problems vary across nations, and between the more and less industrialized countries, and it is important to note that there is no prescribed linear path to "development" that all nations follow. There are substantial variations, shortcuts, and improvements on earlier models that each country can make in its own course. Thus the experience of currently industrialized nations should be generalized with great care. However, there are some similarities in HRD issues facing most countries today. One shared overall dimension is the concern over the relationship between work force skills, productivity, and international competitive position.

While the details may be quite different, most nations share perceptions of inadequacy in educational systems' capacity to keep pace with "upstream" needs as represented by the changing demographics of educational supply. Countries are equally concerned about shortcomings in linkages "downstream" between education and productive employment. Upstream factors in industrialized nations include slower population growth and shifts in the age distribution toward increased proportions of older people. In the developing world, however, continued high population growth threatens to overwhelm the capacity of educational institutions to respond. While in the U.S., for example, median years of schooling have increased from less than 10 years in 1970 to approaching 13 today, in most of the poorest countries, the majority of the population have received less than 3 years of primary school. In some cases, large proportions of the population receive no schooling at all.

"Downstream" factors in the poorer countries include changing job requirements, growing under- and unemployment, and proliferation of "informal" sector jobs which conform less to traditional measurements of employment and are less understood than occupational affiliation in traditional formal sector employment. Particularly disturbing is the phenomenon of "graduate unemployment", which occurs for individuals even after successful completion of secondary or tertiary schooling.

In the face of these difficulties, the need is apparent for more coordinated HRD strategies that explicitly recognize and articulate these upstream and downstream factors in the educational policy environment. Education is only one, albeit a critical one, of the components in the entire complex of public agencies concerned with preparation and effective performance of individuals in productive societal roles. Health, employment, trade, and industrial policy all affect the development and contributions of human resources to economic progress. More integrated HRD approaches will therefore seek to "winch" together these policy domains more explicitly, so that existing mutualities are overtly recognized in the formulation of longer term and cohesive strategies.

Accordingly, this paper offers a working definition of HRD that emphasizes three factors: a continuing process of acquisition and improvement of skills and knowledge; the enhancement of productive application of such skills and knowledge in mutually beneficial ways for both the individual and the contextual group or community; and promotion of equitable opportunities as well as adequate sustenance for individuals to engage in both of the above.

The increased complexity and uncertainties associated with the resulting HRD environment require different kinds of problem-solving in terms of both public policy and individual decisions. A new premium is thus placed on the amount and type of information needed to support these decisions. Singularly lacking in most developing country education/training agencies is a capacity for ongoing diagnostics of key HRD signals that monitor the general fit between preparation for productive employment and employment itself. Labor market information tends to be limited in availability and coverage and fractionated into different government data series often with little commonality. The connection between LMI and education and training policy has in the past primarily been in the field of manpower planning, which has lost credibility but not yet been adequately replaced. Techniques are needed to design where necessary, but more practically in the current climate of fiscal austerity, to adapt existing LMI more effectively to assist both public agency decision making and individual consumer and entrepreneurial choice relating to education, training, employment, and economic development.

A brief review of LMI initiatives in the developing world, as well as in the United States, demonstrates some similarities. There is a noticeable increase in the interest in LMI, and particularly information on the major analytical unit of employment for HRD purposes, the occupation. Innovative data collection and analytical methodologies have begun to emerge in response to these demands; however, inherent difficulties constrain their progress. Occupational classification systems present analytical and conceptual difficulties that need to be addressed, especially as technology continues to reshape and differentiate work activities and requirements in largely unknown ways. In developing countries, the various actors in the composite of production and use of LMI remain mostly separated and uncoordinated. For the proposed improvements in LMI data and diagnostic techniques to work, and to contribute to more intelligent and coordinated

HRD strategies, LMI constituencies need to be more organized. Each user must understand the producer perspective, and *vice versa*.

The U.S. experience with its own occupational information coordinating committees has demonstrated some of the advantages of this cooperative interagency model as a setting for a number of potentially exportable technologies, products, and training packages. The basis for this model in the U.S. is a sound statutory framework, a working consensus at federal and state levels concerning the importance of occupational information in a form usable both by policy makers and individuals, and an established but potentially adaptable federal/state cooperative LMI system that can be augmented and to some extent localized to meet specific user needs. The components of such a broad-based system already exist in some developing, as well as industrialized, countries. Thus the U.S. system has relevance as one model for consideration and possible partial adoption as governments seek to improve their diagnostic and analytical capabilities in forming and implementing HRD policy.

Resources, however, are likely to remain scarce in the public domain for LMI activities, and competition will probably increase for effective technologies in LMI collection and interpretation. With the growing emphasis on continual "radar-like" scanning of important variables in the demographic, educational, health, employment, and economic environment, the technical aspects of prioritization among variables, data collection methodologies, and analytical power will need to be related to economy of effort. Only workable, cost-effective methods will survive.

From the NOICC/SOICC perspective, therefore, something can be gained from ongoing research and development conducted by other governments in coordination with multilateral funding and technical assistance agencies. Techniques such as identification of key labor market signals from household and establishment surveys in Malaysia can have wide relevance for the industrialized as well as the developing world. Commensurately, the diversity of the U.S. economy, flourishing entrepreneurial activity, NOICC/SOICC experience with occupational information technologies, and extended R&D capability located in the network of academic and professional research institutions together constitute a potent resource for future HRD/LMI advances in countries at many different stages of development.

In conclusion, and in view of the severity of the HRD problems facing most countries, LMI is expected to continue to increase in importance worldwide, but the technical aspects of LMI collection and interpretation will continue also to pose problems in need of increasingly sophisticated solutions. Further inequities may be caused by such technical advances in that some of them will be beyond the reach of countries without the requisite capabilities to exploit them fully. As governments and individuals pursue more information for HRD-related decisions, associated information services, whether public or proprietary, will likely remain on the rise. In the public domain, competition for scarce resources will restrict LMI agencies' abilities to respond, necessitating better management of existing resource utilization in data collection and

analysis, and prolonging the search for low cost, effective, and highly flexible methodologies (e.g. modelling and simulation). Effects of technological change on occupational structure and content will continue to plague meaningful classification of occupational units, necessitating more empirical and adaptable classification methods.

Direct translation of industrialized world methods to developing country applications is generally inadvisable, and, in any case, there is sometimes much to be learned from examining more carefully how developing countries are themselves coping with these problems. In the improved climate for international cooperation, increased dialogue between both of these multinational groups is inevitable. The U.S. has much to offer in terms of OIS design and diagnostics, and the final section of this chapter proposes recommendations for promoting this interaction internationally as follows.

Recommendations

It is recognized that NOICC/SOICC activities are publicly funded to meet the needs of American users. However, the international aspects of trade and commerce, as well as the steady flow of human resources across national and cultural boundaries necessitate more complete understanding of HRD characteristics in other countries. Moreover, the shared array of HRD problems facing nations at both ends of the economic spectrum are shaping a common search for effective solutions. While the primary focus of future NOICC/SOICC efforts therefore will be on the domestic U.S. front, it is suggested that the wider dimension implied in extended international liaison and dialogue be included in future plans.

Three types of recommendations for increasing this international dimension in the NOICC/SOICC system are indicated below. The first (1 through 6) addresses the interorganizational aspects of NOICC/SOICC, the networking dimension (which is one of the major strengths of the U.S. system), and the medium through which the system operates. The second group (7 through 15) is directed towards the technical dimensions of system activities, including considerations for future basic research and development agendas. The final (single) recommendation is directed towards the potential for training and technical assistance. All recommendations are directed not only at NOICC and the SOICCs, but also to the wider audience of their constituency agencies as appropriate.

1) Starting within the U.S., and building on existing relationships, begin to extend NOICC/SOICC contacts, informally at first, to identify "stakeholder" groups (i.e. technical, financial, political, development assistance agencies, universities and research institutes, and others) with specific interests in or affiliation for overseas development work in the HRD area; this networking can be expanded to international groups as appropriate and will have potentially two beneficial effects: it will surface areas where collaborative efforts can be useful and, as NOICC/SOICCs respond effectively, begin to construct a substantial new

constituency for such services; it can also open new resource bases, technical and financial, for OIS development and associated activities;

2) Improve generic outreach modalities to the international community (e.g. through international conferences, workshops) for widening general knowledge of the NOICC/SOICC technical capabilities and experience in the area of occupational information; this can be independent of personal contacts and can consist of brochures, publication summaries, or other materials to increase the familiarity of those potentially interested individuals or organizations now outside the Network;

3) Explore the feasibility of mass media methods — particularly radio in view of its utility in developing country applications — for both outreach and occupational information dissemination; this is an embryonic field, but it has considerable possibilities in both the provision of information and the greater involvement of communities and the public as important constituencies in HRD problem-solving;

4) Seek existing or promote innovative international forums for presentation of technical papers on occupational information system technology; the ILO regional LMI workshops and the International Training Center in Turin, Italy, which focus on international LMI issues, for example, could be involved in future LMI "focus" groups;

5) Assess the feasibility of including an international representative (e.g. from the ILO or Canada) as a non-statutory member of the NOICC;

6) Develop ways to further involve the employer community in both cooperation in data provision (improving response rates and reliability/validity of data) as well as in system design and policy formulation; this aspect of organizational/technical liaison is currently being explored in other countries (e.g. Malaysia) and can both strengthen internal NOICC/SOICC functioning and, if successful, provide methodological guidance to others who want to accomplish similar objectives as well;

7) Examine and package the U.S. occupational information system technology as an exportable commodity for countries at many different points along the economic spectrum;

8) Determine cost-effective ways of providing turnkey micro-computerized OIS/CIDS packages for other countries; the widening accessibility of microcomputer technology in almost every developing country makes these kinds of applications increasingly feasible, particularly if they are simple and direct menu-driven systems;

9) Continue to improve theoretical underpinnings of LMI applications to inform technical operations of LMI data collection and analysis; there is a shortage worldwide of cohesive HRD theory within which to collect, analyze, and interpret LMI and occupational information effectively and to provide an adequate policy framework for OIS development and utilization;

10) Develop criteria and methods for prioritizing occupational data elements and explore cost savings associated with explicit steps to aggregate data, remove unnecessary data duplication, and purge LMI systems of outdated or no longer useful records/series; such methodologies will be immediately useful to developing countries with very limited resources;

11) Promote more coordinated HRD strategies (e.g. in NOICC publications) within which LMI data bases, both statistical and qualitative, become more fundamentally valuable to wider constituencies both in the U.S. and overseas;

12) Promote the development of explicit programmatic exploration of basic research questions in occupational information system design in industrialized countries where resources are relatively larger and more technically developed; such research issues might include, for example:

- the definition and classification of "occupation";
- relationships between "occupation" and "skill/knowledge";
- use of microcomputers in LMI data analysis, simulation modelling, etc;
- more involvement in LMI issues of the research and academic communities; and
- improving techniques for LMI collection and interpretation for localities, rural areas, and employment outside the formal modern sector;

13) Determine how data not currently available or adequate — but important to future HRD decision making in other industrialized as well as developing countries — can be cost effectively augmented or derived secondarily; examples include data on HRD utilization such as educational levels of employees by occupation, career ladders, occupational mobility; data on part-time v. full-time occupational employment and on the self-employed;

14) Examine the relevance and contribution of more informal and qualitative data, such as obtained through the key informants method, to understanding of rural and inner-city labor markets where more formal methods are less applicable; there is considerable research literature in the U.S. on qualitative research methods, "unobtrusive" measurement, and use of key informants; ways in which the key informants method can be tightened without losing its applicability and low cost will be of particular interest to the developing world;

15) Explore the feasibility of inclusion/exchange of international data in OIS/CIDS; reflecting the NOICC/SOICC and other country interests in expanding systems in the direction of economic development-oriented information, these data could be linked explicitly to foreign investment interests and location decisions; they could also include descriptive occupational characteristics, for example, of foreign nationals educated/trained in the U.S. but returning overseas for employment; and

16) Provide collaborative training and technical assistance in LMI techniques in tailored settings that permit developing country representatives to impart their own

experiences as well as to receive information directly relevant to their technical needs; the role of the ILO and the Turin Center as initial consultants or potential collaborators/partners should be explored in this regard.

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